CHAPTER 6

RESTORATION STRATEGIES IN THE UPPER HATCHIE RIVER WATERSHED

6.1. BACKGROUND.

The Watershed Water Quality Management Plan serves as a comprehensive inventory of resources and stressors in the watershed, a recommendation for control measures, and a guide for planning activities in the next five-year watershed cycle and beyond. Water quality improvement will be a result of implementing both regulatory and nonregulatory programs.

In addition to the NPDES program, some state and federal regulations, such as the TMDL and ARAP programs, address point and nonpoint issues. Construction and MS4 storm water rules (implemented under the NPDES program) have transitioned from Phase 1 to Phase 2. More information on storm water rules may be found at: http://www.state.tn.us/environment/wpc/stormh2o/.

This Chapter addresses point and nonpoint source approaches to water quality problems in the Tennessee portion of the Upper Hatchie River Watershed.

6.2. COMMENTS FROM PUBLIC MEETINGS. Watershed meetings are open to the public, and most meetings were represented by citizens who live in the watershed, NPDES permitees, business people, farmers, and local river conservation interests. Locations for meetings were chosen after consulting with people who live and work in the watershed. Everyone with an interest in clean water is encouraged to be a part of the public meeting process. The times and locations of watershed meetings are posted at: http://www.state.tn.us/environment/wpc/watershed/public.shtml.

6.2.A. Year 1 Public Meeting. The first Upper Hatchie River Watershed public meeting was held jointly with the Hatchie Watershed on September 16, 1999 at the Brownsville Utility Building. The goals of the meeting were to: (1) present, and review the objectives of, the Watershed Approach, (2) introduce local, state, and federal agency and nongovernmental organization partners, (3) review water quality monitoring strategies, and (4) solicit input from the public.

Major Concerns/Comments

- Garbage, especially trash in the stream
- Growth restrictions due to efforts directed at clean water
- Fish safe to eat
- Changes in hydrology seen in the last fifteen years
- Sediment in the Hatchie River from Mississippi
- Accelerated timber harvests due to fear of timber loss where floodplain is standing water (due to hydrological modification)

6.2.B. Year 3 Public Meeting. The second Upper Hatchie River Watershed public meeting was held jointly with the Hatchie Watershed December 6, 2001 at The Nature Conservancy Office in Brownsville. The goals of the meeting were to: (1) provide an overview of the watershed approach, (2) review the monitoring strategy, (3) summarize the most recent water quality assessment, (4) discuss the TMDL schedule and citizens' role in commenting on draft TMDLs, and (5) discuss BMPs and other nonpoint source tools available through the Tennessee Department of Agriculture 319 Program and NRCS conservation assistance programs.

Major Concerns/Comments

- Poor logging practices along the Hatchie lead to increases in sediment load
- Increased pesticides in water from poor agricultural practices
- Hatchie River has less water than it did 50 years ago (pools are shallower due to more sediment)
- Tree tops left in the river after timber harvesting capture sediment so the river is filling in
- Increased frequency of cutting timber early to avoid dead timber after flooding

6.2.C. Year 5 Public Meeting. The third scheduled Upper Hatchie River Watershed public meeting was held October 11, 2007 at the City Hall in Bolivar. The meeting was held jointly with the Hatchie River Watershed and featured nine educational components:

- Overview of watershed approach flash video
- Benthic macroinvertebrate specimens and interpretation
- SmartBoard™ with interactive GIS maps
- "Is Your Stream Healthy" self-guided slide show
- "Why We Do Biological Sampling" self-guided slide show
- Water supply and ground water protection educational display
- Water quality and land use maps
- The Nature Conservancy educational display
- Hatchie River Conservancy educational display

In addition, citizens had the opportunity to make formal comments on the draft Watershed Water Quality Management Plan.

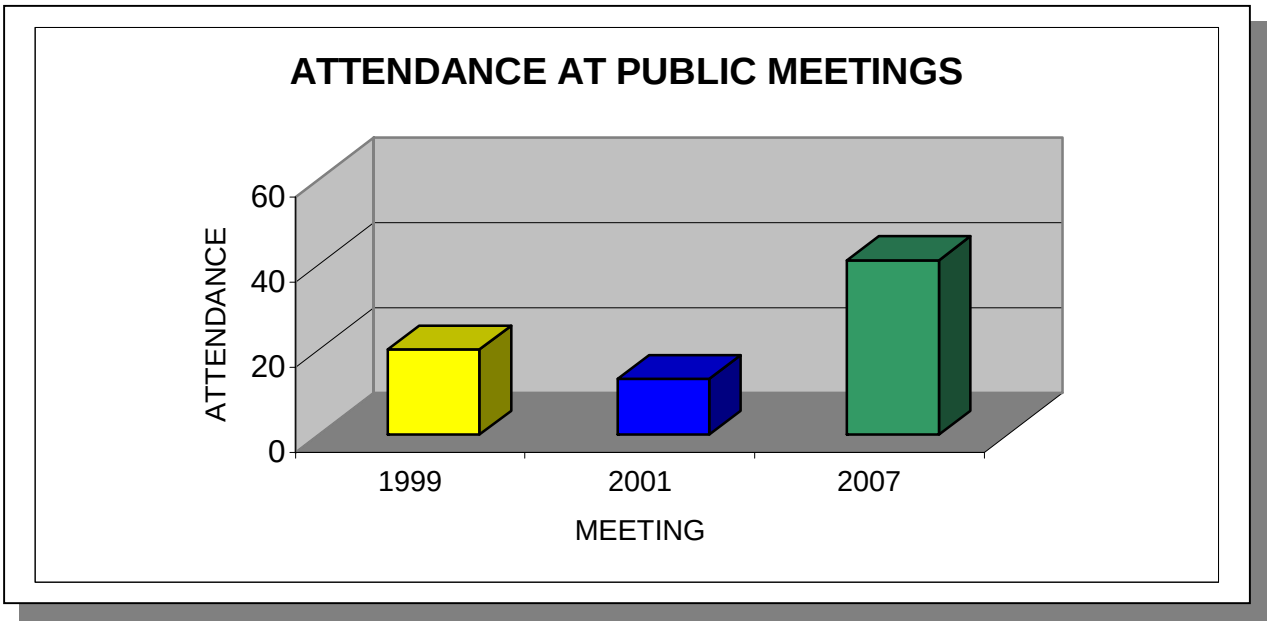

Figure 6-1. Attendance at the Upper Hatchie River and Lower Hatchie River Watersheds Joint Public Meetings. *Attendance numbers do not include TDEC personnel.*

Figure 6-2. Jackson Environmental Field Office Manager Pat Patrick Brings the Watershed Meeting to Order.

Figure 6-3. Displays by NGOs, Like The Nature Conservancy, Attract Interest at the Watershed Meeting.

Figure 6-4. The SmartBoard™ is an Effective Interactive Tool to Teach Citizens About the Power of GIS.

Figure 6-5. Local Groups, Like the Hatchie River Conservancy, Have an Opportunity to Talk About Their Work with Citizens at the Watershed Meeting.

6.3. APPROACHES USED.

6.3.A. Point Sources. Point source contributions to stream impairment are primarily addressed by NPDES and ARAP permit requirements and compliance with the terms of the permits. Notices of NPDES and ARAP draft permits available for public comment can be viewed at http://www.state.tn.us/environment/wpc/wpcppo/. Discharge monitoring data submitted by NPDES-permitted facilities may be viewed at http://www.epa.gov/enviro/html/pcs/pcs_query_java.html.

The purpose of the TMDL program is to identify remaining sources of pollution and allocate pollution control needs in places where water quality goals are still not being achieved. TMDL studies are tools that allow for a better understanding of load reductions necessary for impaired streams to return to compliance with water quality standards. More information about Tennessee's TMDL program may be found at: http://www.state.tn.us/environment/wpc/tmdl/.

TMDLs are prioritized for development based on many factors.

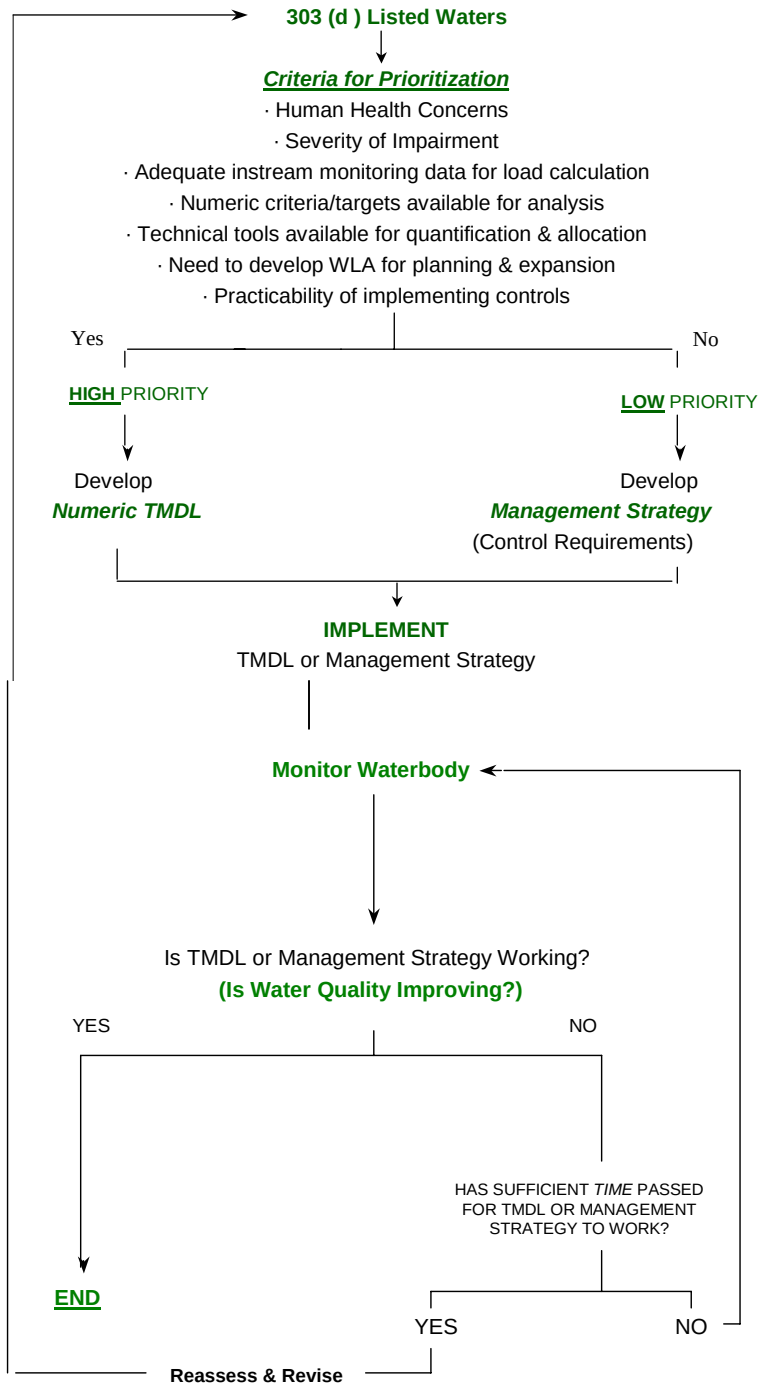

Figure 6-6. Prioritization Scheme for TMDL Development.

6.3.B. Nonpoint Sources

Common nonpoint sources of pollution in the Upper Hatchie River Watershed include urban storm water runoff, riparian vegetation removal and other habitat alterations, as well as inappropriate land development, road construction, and agricultural practices. Since nonpoint pollution exists essentially everywhere rain falls, existing point source regulations can have only a limited effect. Other measures are, therefore, necessary.

There are several state and federal regulations that address contaminants impacting waters in the Upper Hatchie River Watershed. Most of these are limited to point sources: a pipe or ditch. Often, controls of point sources are not sufficient to protect waters, so other measures are necessary. Some measures include efforts by landowners and volunteer groups and the possible implementation of new regulations. Many agencies, such as the Tennessee Department of Agriculture (TDA) and the Natural Resources Conservation Service (NRCS), offer financial assistance to landowners for corrective actions (like Best Management Practices) that may be sufficient for recovery of impacted streams. Many nonpoint problems will require an active civic involvement at the local level geared towards establishment of improved zoning guidelines, building codes, streamside buffer zones and greenways, and general landowner education.

The following text describes types of impairments, possible causes, and suggested improvement measures. Restoration efforts should not be limited to only those streams and measures suggested below.

6.3.B.i. Sedimentation.

6.3.B.i.a. From Construction Sites. Construction activities have historically been considered “nonpoint sources.” In the late 1980’s, EPA designated them as being subject to NPDES regulation if more than 5 acres were being disturbed. In the spring of 2003, that threshold became 1 acre. The general permit issued for such construction sites establishes conditions for maintenance of the sites to minimize pollution from storm water runoff, including requirements for installation and inspection of erosion prevention and sediment controls. Also, the general permit imposes more stringent inspection, design criteria, sediment control measures, and self-monitoring requirements on sites in the watershed of streams that are already impaired due to sedimentation or are considered high quality. Regardless of the size, no construction site is allowed to cause a condition of pollution.

Beginning in 2003, the state began requiring some municipalities to obtain coverage under a permit designed to address nonpoint runoff issues: the General NPDES Municipal Separate Storm Sewer System Permit, commonly known as MS4. This permit requires the holder to develop a comprehensive storm water management program, including the adoption of local regulatory ordinances, regular inspection of construction sites and other discharges into their storm sewers, and a variety of educational, mapping, and monitoring activities. The state audits and oversees these local MS4 programs.

6.3.B.i.b. From Channel and/or Bank Erosion. Many streams within the Upper Hatchie River Watershed suffer from varying degrees of streambank erosion. When steam channels are altered, banks can become unstable and highly erodable. Heavy livestock traffic can also severely disturb banks. When large tracts of land are cleared of vegetation (especially trees) and replaced with impermeable surfaces like asphalt and rooftops, the large increases in the velocities and volumes of storm water runoff can also overwhelm channel and bank integrity because destabilized banks contribute to sediment loadings and to the loss of beneficial riparian vegetation.

Some inappropriate agricultural practices and overzealous land development have impacted the hydrology and morphology of stream channels in this watershed, although none severely enough to cause a loss of use impairment at this time.

Several agencies such as the NRCS and TDA, as well as citizen watershed groups, are working to stabilize portions of stream banks using bioengineering and other techniques. Many of the affected streams could benefit from these types of projects.

Some methods or controls that might be necessary to address common problems are:

Voluntary Activities

- Re-establish bank vegetation.
- Establish off-channel watering areas for livestock by moving watering troughs and feeders back from stream banks, or at least limit cattle access to restricted areas with armored bank entry.
- Limit cattle access to streams and bank vegetation.

Regulatory Strategies.

- Increase efforts in the Master Logger program to recognize impaired streams and require more effective management practices.
- Require post-construction run-off rates to be no greater than pre-construction rates in order to avoid in-channel erosion.
- Encourage or require strong local buffer ordinances.
- Implement additional restrictions on logging in streamside management zones.
- Restrict the use of off-highway vehicles on stream banks and in stream channels.

Additional Strategies

- Better community planning for the impacts of development on small streams, especially development in growing areas
- Limit clearing of stream and ditch banks or other alterations. *Note: Permits may be required for any work along streams.*
- Limit road and utility crossings of streams through better site design.

6.3.B.i.c. From Agriculture and Silviculture. The Water Quality Control Act exempts normal agricultural and silvicultural practices that do not result in a point source discharge. Nevertheless, efforts are being made to address impacts due to these exempted practices.

The Master Logger Program has been in place for several years to train loggers how to install Best Management Practices that lessen the impact of logging activities on streams. Recently, laws and regulations established the authority for the Commissioners of the Departments of Environment and Conservation and of Agriculture to stop the logging operation that, upon failing to install these BMPs, is causing impacts to streams.

Since the Dust Bowl era, the agriculture community has strived to protect the soil from wind and water erosion. Agencies such as the Natural resources Conservation Service (NRCS), the University of Tennessee Agricultural Extension Service, and the Tennessee Department of Agriculture are striving to identify better ways of farming, to educate the farmers, and to install the methods that address the sources of some of the impacts due to agriculture. Cost sharing is available for many of these measures.

Many sediment problems traceable to agricultural practices also involve riparian loss due to close row cropping or pasture clearing for grazing. Lack of vegetated buffers along stream corridors is a problem in some areas of the Upper Hatchie River Watershed, due both to agricultural and residential/commercial land uses. Many streams could benefit from the establishment of more extensive riparian buffer zones.

6.3.B.ii. Pathogen Contamination.

Possible sources of pathogens in streams are inadequate or failing septic tank systems, overflows or breaks in public sewer collection systems, poorly disinfected discharges from sewage treatment plants, and fecal matter from pets, livestock and wildlife washed into streams and storm drains. When fecal bacterial levels are shown to be consistently elevated to dangerously high levels, especially in streams with high potential for recreational uses, the division must post signage along the creek warning the public to avoid contact. Once pathogen sources have been identified and corrected, and pathogen level reductions are documented, the posting is lifted.

Permits issued by the Division of Water Pollution Control regulate discharges from point sources and require adequate control for these sources. Individual homes are required to have subsurface, on-site treatment (i.e., septic tank and field lines) if public sewers are not available. The Division of Ground Water Protection within the Jackson Environmental Field Office and delegated county health departments regulate septic tanks and field lines. In addition to discharges to surface waters, businesses may employ subsurface treatment for domestic wastewater or surface discharge of treated process wastewater. The Division of Water Pollution Control regulates surface water discharges and near-surface land application of treated wastewater.

Some measures that may be necessary to control pathogens are:

Voluntary Activities

- Clean up pet waste.
- Repair failed septic systems.
- Establish off-channel watering of livestock.
- Limit livestock access to streams and restrict stream crossings.
- Improve and educate on the proper management of animal waste from confined feeding operations.

Regulatory Strategies

- Strengthen enforcement of regulations governing on-site wastewater treatment.
- Determine timely and appropriate enforcement for non-complying sewage treatment plants, large and small, and their collection systems.
- Identify Concentrated Animal Feeding Operations not currently permitted.
- Develop and enforce leash laws and controls on pet fecal material.
- Review the pathogen limits in discharge permits to determine the need for further restriction.

Additional strategies

- Develop intensive planning in areas where sewer is not available and treatment by subsurface disposal is not an option due to poor soils, floodplains, or high water tables.
- Greater efforts by sewer utilities to identify leaking lines or overflowing manholes.

6.3.B.iii. Excessive Nutrients and/or Dissolved Oxygen Depletion.

These two impacts are usually listed together because high nutrients often contribute to low dissolved oxygen within a stream. Since nutrients often have the same source as pathogens, the measures previously listed can also address many of these problems. Elevated nutrient loadings are also often associated with urban runoff from impervious surfaces, from fertilized lawns and croplands, and faulty sewage disposal processes. Nutrients are often transported with sediment, so many of the measures designed to reduce sediment runoff will also aid in preventing organic enrichment of streams and lakes.

Dissolved oxygen depletion can also be due to the discharge of other biodegradable materials. These are limited in NPDES permits as ammonia and as either Biological Oxygen Demand (BOD) or Carbonaceous Oxygen Demand (CBOD).

Some sources of nutrients can be addressed by:

Voluntary Activities

- Educate homeowners and lawn care companies in the proper application of fertilizers.
- Encourage landowners, developers, and builders to leave stream buffer zones. Streamside vegetation can filter out many nutrients and other pollutants before they reach the stream. These riparian buffers are also vital along livestock pastures.
- Use grassed drainage ways that can remove fertilizer before it enters streams.
- Use native plants for landscaping since they don't require as much fertilizer and water.
- Develop Impose tmanagement in urban and residential areas, including retrofitting existing commercial lots, homes, and roadways with storm water quality and quantity BMPs. This would especially improve the urban streams and lakes currently polluted by excessive nutrient inputs.

Physical changes to streams can prevent them from providing enough oxygen to biodegrade the materials that are naturally present. A few additional actions can address this problem:

- Maintain shade over a stream. Cooler water can hold more oxygen and retard the growth of algae. As a general rule, all stream channels suffer from some canopy removal. An intact riparian zone also acts as a buffer to filter out nutrient loads before they enter the water.
- Discourage impoundments. Ponds and lakes do not aerate water. *Note: Permits may be required for any work on a stream, including impoundments.*

Regulatory Strategies.

- Strengthen enforcement of regulations governing on-site wastewater treatment.
- Impose more stringent permit limits for nutrients discharged from sewage treatment plants.
- Timely and appropriate enforcement for noncomplying sewage treatment plants, large and small, and their collection systems.
- Identify Concentrated Animal Feeding Operations (CAFO) not currently permitted.
- Identify any Animal Feeding Operations (AFO) that contribute to stream impacts and declare them as a CAFO requiring a permit.
- Require nutrient management plans for all golf courses.

Additional Strategies.

- Encourage TDA- and NRCS-sponsored educational programs targeted to agricultural landowners and aimed at better nutrient management, as well as information on technology-based application tools.

6.3.B.iv. Toxins and Other Materials.

Although some toxic substances are discharged directly into waters of the state from a point source, much of these materials are washed in during rainfalls from an upland location, or via improper waste disposal that contaminates groundwater. In the Tennessee portion of the Upper Hatchie River Watershed, a relatively small number of streams are damaged by storm water runoff from industrial facilities or urban areas. More stringent inspection and regulation of permitted industrial facilities, and local storm water quality initiatives and regulations, could help reduce the amount of contaminated runoff reaching state waters.

Individuals may also cause contaminants to enter streams by activities that may be attributed to apathy or the lack of knowledge or civility. Litter in roadside ditches, garbage bags tossed over bridge railings, paint brushes washed off over storm drains, and oil drained into ditches are all blatant examples of pollution in streams. To lessen the future impact to the waters of the state, each community can strive to raise its awareness for better conservation practices and prosecution of violators.

Some of these problems can be addressed by:

Voluntary Activities

- Provide public education.
- Paint warnings on storm drains that connect to a stream.
- Sponsor community clean-up days.
- Landscape public areas.
- Encourage public surveillance of their streams and reporting of dumping activities to their local authorities.

Regulatory Strategies

- Continue to prohibit illicit discharges to storm drains and to search them out.
- Strengthen litter law enforcement at the local level.
- Increase the restrictions on storm water runoff from industrial facilities.

6.3.B.v. Habitat Alteration.

The alteration of the habitat within a stream can have severe consequences. Whether it is the removal of the vegetation providing a root system network for holding soil particles together, the release of sediment, which increases the bed load and covers benthic life and fish eggs, the removal of gravel bars, “cleaning out” creeks with heavy equipment, or the impounding of the water in ponds and lakes, many alterations impair the use of the stream for designated uses. Habitat alteration also includes the draining or filling of wetlands.

Although large-scale public projects such as highway construction can alter significant portions of streams, individual landowners and developers are responsible for the vast majority of stream alterations. Some measures that can help address these problems are:

Voluntary Activities

- Sponsor litter pickup days to remove litter that might enter streams
- Organize stream cleanups removing trash, limbs and debris before they cause blockage.
- Avoid use of heavy equipment to "clean out" streams. Instream work other than debris removal will require an Aquatic Resource Alteration Permit (ARAP).
- Plant native vegetation along streams to stabilize banks and provide habitat.
- Encourage developers to avoid extensive use of culverts in streams.

Regulatory Strategies

- Restrict modification of streams by means such as culverting, lining, or impounding.
- Require mitigation for impacts to streams and wetlands when modifications are allowed.
- Require permitting of all rock harvesting operations.
- Increased enforcement may be needed when violations of current regulations occur, especially for illicit gravel dredging.

6.3.B.vi. Storm Water.

MS4 discharges are regulated through the Phase I or II NPDES-MS4 permits. These permits require the development and implementation of a Storm Water Management Program (SWMP) that will reduce the discharge of pollutants to the maximum extent practicable and not cause or contribute to violations of state water quality standards. The NPDES General Permit for Discharges from Phase I and II MSF facilities can be found at:

http://www.state.tn.us/environment/wpc/stormh2o/.

For discharges into impaired waters, the MS4 General Permit requires that SWMPs include a section describing how discharges of pollutants of concern will be controlled to ensure that they do not cause or contribute to instream exceedances of water quality standards. Specific measurements and BMPs to control pollutants of concern must also be identified. In addition, MS4s must implement the proposed waste load allocation provisions of an applicable TMDL (i.e., siltation/habitat alteration, pathogens) and describe methods to evaluate whether storm water controls are adequate to meet the waste load allocation. In order to evaluate SWMP effectiveness and demonstrate compliance with specified waste load allocations, MS4s must develop and implement appropriate monitoring programs.

Some storm sewer discharges are not regulated through the NPDES MS4 program. Strategies to address runoff from in these urban areas include adapting Tennessee Growth Readiness Program (TGRP) educational materials to the watershed. TGRP is a statewide program built on existing best management practices from the Nonpoint Education for Municipal Officials program and the Center for Watershed Protection. TGRP developed the program to provide communities and counties with tools to design economically viable and watershed friendly developments. The program assists

community leaders in reviewing current land use practices, determining impacts of imperviousness on watershed functions, and allowing them to understand the economics of good watershed management and site design.

6.4. PERMIT REISSUANCE PLANNING

Under the *Tennessee Water Quality Control Act*, municipal, industrial and other dischargers of wastewater must obtain a permit from the Division. Approximately 1,700 permits have been issued in Tennessee under the federally delegated National Pollutant Discharge Elimination System (NPDES). These permits establish pollution control and monitoring requirements based on protection of designated uses through implementation of water quality standards and other applicable state and federal rules.

The following three sections provide specific information on municipal, industrial, and water treatment plant active permit holders in the Upper Hatchie River Watershed. Compliance information was obtained from EPA's Permit Compliance System (PCS). All data was queried for a five-year period between August 1, 2002 and July 31, 2007. PCS can be accessed publicly through EPA's Envirofacts website. This website provides access to several EPA databases to provide the public with information about environmental activities that may affect air, water, and land anywhere in the United States:

http://www.epa.gov/enviro/html/ef_overview.html

Stream Segment information, including designated uses and impairments, are described in detail in Chapter 3, *Water Quality Assessment of the Upper Hatchie River Watershed.*

6.4.A. Municipal Permits

TN0077917 City of Bolivar STP

Discharger rating: Minor
City: Bolivar
County: Hardeman
EFO Name: Jackson
Issuance Date: 5/1/07
Expiration Date: 2/27/10
Receiving Stream(s): Hatchie River at mile 131.0
HUC-12: 080102080105
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Lagoon with complete mix aeration cells, polishing ponds, and chlorination.

Segment	TN08010207001_1000
Name	Hatchie River
Size	22.7
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Domestic Water Supply (Supporting), Industrial Water Supply (Supporting), Fish and Aquatic Life (Supporting), Recreation (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

Table 6-1. Stream Segment Information for Bolivar STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	All Year	24	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	210	lb/day	WAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	280	lb/day	DMax Load	3/Week	Composite	Effluent net value
Ammonia as N (Total)	All Year	140	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	18	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	12	mg/L	MAvg Conc	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurences/ Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	Percent Removal
CBOD5	All Year	35	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year	261	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	All Year	29	mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year	22	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year	338	lb/day	WAvg Load	3/Week	Composite	Effluent
CBOD5	All Year	404	lb/day	DMax Load	3/Week	Composite	Effluent net value
D.O.	All Year	3	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	487	#/100mL	DMax Conc	3/Week	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
IC25 7day Ceriodaphnia Dubia	All Year	1.67	Percent	DMin Conc	Monthly	Composite	Effluent
IC25 7day Fathead Minnows	All Year	1.67	Percent	DMin Conc	Monthly	Composite	Effluent
Nitrogen Total (as N)	All Year	39.4	mg/L	MAvg Conc	2/Week	Composite	Effluent
Nitrogen Total (as N)	All Year	460	lb/day	MAvg Load	2/Week	Composite	Effluent
Overflow Use Occurences	All Year		Occurences/ Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurences	All Year		Occurences/ Month	MAvg Load	Continuous	Visual	Non Wet Weather
Phosphorus, Total	All Year	1.1	mg/L	MAvg Conc	2/Week	Composite	Effluent
Phosphorus, Total	All Year	13	lb/day	MAvg Load	2/Week	Composite	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Composite	Effluent

Table 6-2a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
TRC	All Year	1	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	467	lb/day	WAvg Load	3/Week	Composite	Effluent
TSS	All Year	35	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year	409	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	525	lb/day	DMax Load	3/Week	Composite	Effluent net value
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	Percent Removal
pH	All Year	8.5	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-2b.

Tables 6-2a-b. Permit Limits for Bolivar STP.

Compliance History:
The following numbers of exceedences were noted in PCS:

9 Total Phosphorus
8 Carbonaceous Biological Oxygen Demand
2 Suspended Solids % Removal
2 Total Chlorine
3 Total Suspended Solids
1 Carbonaceous Oxygen Demand
1 pH

Comments:
1-17-07, Bolivar has built a larger lagoon system (TN0077917) on the site of TN0025275 to replace both TN0025275 and TN0062189.

5/1/07 Reconnaissance Inspection:
Grass in spots on the inside of the dikes needs to be cut. Effluent sampling continues to show high phosphorous. Bolivar reported that money is available and will be spent to install a chemical feed system in the third pond to remove phosphorous.

TN0077721 Bethel Springs STP

Discharger rating: Minor
City: Bethel Springs
County: McNairy
EFO Name: Jackson
Issuance Date: 1/1/03
Expiration Date: 11/27/07
Receiving Stream(s): Unnamed tributary at mile 0.2 to Cypress Creek at mile 19.8
HUC-12: 080102070601
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Septic Tank Effluent Pump (STEP) collection system

Segment	TN08010207031_0600
Name	Unnamed Trib to Cypress Creek
Size	10.6
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Recreation (Not Assessed), Fish and Aquatic Life (Not Assessed), Livestock Watering and Wildlife (Not Assessed), Irrigation (Not Assessed)
Causes	N/A
Sources	N/A

Table 6-3. Stream Segment Information for Bethel Springs STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	All Year	2	mg/L	DMax Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	All Year	1	mg/L	WAvg Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	All Year	0.8	lb/day	MAvg Load	Weekly	Grab	Effluent
Ammonia as N (Total)	All Year	1.5	mg/L	MAvg Conc	Weekly	Grab	Effluent
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	Percent Removal
CBOD5	All Year	20	mg/L	DMax Conc	Weekly	Grab	Effluent
CBOD5	All Year	15	mg/L	MAvg Conc	Weekly	Grab	Effluent
CBOD5	All Year	5	lb/day	MAvg Load	Weekly	Grab	Effluent
CBOD5	All Year	10	mg/L	DMin Conc	Weekly	Grab	Effluent
CBOD5	All Year	7.5	lb/day	DMax Load	Weekly	Grab	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	Weekly	Grab	Effluent
Fecal Coliform	All Year	100	#/100mL	DMax Conc	Weekly	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	Weekly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	Weekly	Grab	Effluent
TSS	All Year		mg/L	DMax Conc	Weekly	Grab	Influent (Raw Sewage)
TSS	All Year	20	lb/day	DMax Load	Weekly	Grab	Effluent
TSS	All Year		mg/L	WAvg Conc	Weekly	Grab	Influent (Raw Sewage)
TSS	All Year	15	lb/day	MAvg Load	Weekly	Grab	Effluent
TSS	All Year	40	mg/L	MAvg Conc	Weekly	Grab	Effluent
TSS	All Year	30	mg/L	WAvg Conc	Weekly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-4. Permit Limits for Bethel Springs STP.

Comments:
None.

TN0062642 Middleton Wastewater Lagoon

Discharger rating: Minor
City: Middleton
County: Hardeman
EFO Name: Jackson
Issuance Date: 10/1/05
Expiration Date: 8/30/09
Receiving Stream(s): Hatchie River mile 174.2
HUC-12: 080102070401
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Lagoon system

Segment	TN08010207001_1000
Name	Hatchie River
Size	22.7
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Domestic Water Supply (Supporting), Industrial Water Supply (Supporting), Fish and Aquatic Life (Supporting), Recreation (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

Table 6-5. Stream Segment Information for Middleton Wastewater Lagoon.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
48hr LC50: Ceriodaphnia Dubia	All Year	1.8	Percent	DMin Conc	Quarterly	Grab	Effluent
48hr LC50: Fathead Minnows	All Year	1.8	Percent	DMin Conc	Quarterly	Grab	Effluent
Ammonia as N (Total)	Summer	10	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	12	lb/day	WAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	5	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	17	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	8	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	7.5	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	20	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	17	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	15	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	33	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	25	lb/day	WAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	10	mg/L	MAvg Conc	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD % Removal	All Year	65	Percent	MAvg % Removal	3/Week	Calculated	Percent Removal
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year	30	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	All Year	42	lb/day	WAvg Load	3/Week	Composite	Effluent
CBOD5	All Year	25	mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year	33	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	All Year	20	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year	50	lb/day	DMax Load	3/Week	Composite	Effluent
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
D.O.	All Year	3	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	487	#/100mL	DMax Conc	3/Week	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Non Wet Weather
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Grab	Effluent

Table 6a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
TRC	All Year	2	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	60	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year	100	lb/day	DMax Load	3/Week	Composite	Effluent
TSS	All Year	92	lb/day	WAvg Load	3/Week	Composite	Effluent
TSS	All Year	55	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year	83	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year	50	mg/L	MAvg Conc	3/Week	Composite	Effluent
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6a.

Tables 6-6a-b. Permit Limits for Middleton Wastewater Lagoon.

Compliance History:
The following numbers of exceedences were noted in PCS:

20 Overflows

Comments:
10/17/07 Compliance Evaluation Inspection:
With one exception, all lift stations were found to be in good operating condition. The shroud on the Thyssen-Krupp station was unlocked, the alarm light had not been installed on the outside, the check valve arms were not working and the station needed to be cleaned.

One of the ten horsepower aerators at the lagoon was out of service.

Grant money is coming to provide for the replacement of the Country Kitchen and lagoon influent lift stations.

10/17/06 Compliance Evaluation Inspection:
Not all lift stations were locked and the drive to the Dover station was muddy and in need of gravel. Influent flow was not being measured correctly and a thermometer should be placed in the composite samplers.

TN0062308 Selmer STP

Discharger rating: Minor
City: Selmer
County: McNairy
EFO Name: Jackson
Issuance Date: 1/1/06
Expiration Date: 10/30/10
Receiving Stream(s): Cypress Creek at mile 14.5
HUC-12: 080102070601
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Oxidation ditch activated sludge with chlorination

Segment	TN08010207031_3000
Name	Cypress Creek
Size	6.7
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Recreation (Not Assessed), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

Table 6-7. Stream Segment Information for Selmer STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	7.1	mg/L	DMax Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	Summer	106	lb/day	DMax Load	Weekly	Grab	Effluent
Ammonia as N (Total)	Summer	5.3	mg/L	WAvg Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	Summer	106	lb/day	DMax Load	Weekly	Grab	Effluent
Ammonia as N (Total)	Summer	3.54	mg/L	MAvg Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	Summer	53	lb/day	MAvg Load	Weekly	Grab	Effluent
Ammonia as N (Total)	Winter	21.7	mg/L	DMax Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	Winter	10.86	mg/L	MAvg Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	Winter	163	lb/day	MAvg Load	Weekly	Grab	Effluent
Ammonia as N (Total)	Winter	16.3	mg/L	WAvg Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	Winter	326	lb/day	DMax Load	Weekly	Grab	Effluent
Ammonia as N (Total)	Winter	244.7	lb/day	WAvg Load	Weekly	Grab	Effluent
Bypass of Treatment (occurrences)	All Year		Occurrences/Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD % Removal	All Year	65	Percent	MAvg % Removal	Weekly	Calculated	%Removal
CBOD5	All Year		mg/L	DMax Conc	Weekly	Composite	Influent (Raw Sewage)
CBOD5	All Year		mg/L	MAvg Conc	Weekly	Composite	Influent (Raw Sewage)
CBOD5	Summer	45	mg/L	DMax Conc	Weekly	Grab	Effluent
CBOD5	Summer	30	mg/L	DMin Conc	Weekly	Grab	Effluent
CBOD5	Summer	450	lb/day	MAvg Load	Weekly	Grab	Effluent
CBOD5	Summer	40	mg/L	MAvg Conc	Weekly	Grab	Effluent
CBOD5	Summer	600	lb/day	DMax Load	Weekly	Grab	Effluent
CBOD5	Summer	675	lb/day	DMax Load	Weekly	Grab	Effluent
CBOD5	Winter	60	mg/L	DMax Conc	Weekly	Grab	Effluent
CBOD5	Winter	901	lb/day	DMax Load	Weekly	Grab	Effluent
CBOD5	Winter	40	mg/L	DMin Conc	Weekly	Grab	Effluent
CBOD5	Winter	600	lb/day	MAvg Load	Weekly	Grab	Effluent
CBOD5	Winter	50	mg/L	MAvg Conc	Weekly	Grab	Effluent
CBOD5	Winter	751	lb/day	DMax Load	Weekly	Grab	Effluent
Cu (T)	All Year	0.029	mg/L	DMax Conc	Monthly	Composite	Effluent
Cyanide, Total (CN-)	All Year	0.012	mg/L	DMax Conc	Monthly	Grab	Effluent
D.O.	All Year	5.5	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	941	#/100mL	DMax Conc	Weekly	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	Weekly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Weekdays	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Weekdays	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Weekdays	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Weekdays	Continuous	Influent (Raw Sewage)

Table 6-8a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
IC25 7day Ceriodaphnia dubia	All Year	27	Percent	DMin Conc	Monthly	Composite	Effluent
IC25 7day Fathead Minnows	All Year	27	Percent	DMin Conc	Monthly	Composite	Effluent
Overflow Use Occurrences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurrences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Non Wet Weather
Pb (T)	All Year	0.009	mg/L	MAvg Conc	Monthly	Grab	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	0.08	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	120	mg/L	DMax Conc	Weekly	Grab	Effluent
TSS	All Year	1651	lb/day	DMax Load	Weekly	Grab	Effluent
TSS	All Year	1801	lb/day	DMax Load	Weekly	Grab	Effluent
TSS	All Year	100	mg/L	WAvg Conc	Weekly	Grab	Effluent
TSS	All Year	1501	lb/day	MAvg Load	Weekly	Grab	Effluent
TSS	All Year	110	mg/L	MAvg Conc	Weekly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent
pH	Summer	10	SU	DMax Conc	Weekdays	Grab	Effluent
pH	Winter	9	SU	DMax Conc	Weekdays	Grab	Effluent

Table 6-8b.

Tables 6-8a-b. Permit Limits for Selmer STP.

Compliance History:
The following numbers of exceedences were noted in PCS:

28 pH
16 Total Silver
1 Total Suspended Solids
1 Total Cyanide
3 Carbonaceous Biological Oxygen Demand
1 Carbonaceous Oxygen Demand
2 Fecal Coliform
3 Ammonia
1 Total Copper

Enforcement:
6/17/04 Consent Order #04-0012 for violation of silver limits in Dec '02, Jan '03, March '03, and April '03.

Comments:
3/22/07 Reconnaissance Inspection
Because it is a lagoon, there are high pH results sometimes, especially in the summer. Selmer has also had trouble meeting its silver limit and is working with the pretreatment section to correct the problem. There are other occasional permit exceedances and it was suggested that perhaps replacing the curtains would help.

2/21/07 Reconnaissance Inspection
Selmer has finished its sewer system rehabilitation project. Selmer voted a year or two ago to take and treat Bethel Springs wastewater. Bethel Springs has since had second thoughts and is once again considering building its own wastewater treatment facility. An NPDES permit was issued to Bethel Springs in 2003.

6/22/06 Pretreatment Inspection
Selmer's pretreatment program was in order. The files were well maintained and information was readily accessible. Silver is still an issue that the city is dealing with. However, it appears that WPC's Permit Section has concluded during the reissuance of their NPDES permit that the very small limit sent to Selmer for Silver may be in error. A higher limit appears to be applicable. If change is made in the reissued permit, several pretreatment compliance issues will be resolved.